

REMARKS

Antecedent basis for new dependent Claim 22 exists in the Specification at page 17 paragraph 0050.

Responsive to the rejection of Claims 1-6, 9-16 and 18-21 under Section 103(a) on '599, '026 or '494 in view of '786 and the rejection of Claims 7-8 and 17 on those references further in view of '064, Applicant respectfully requests reconsideration based upon the following remarks noting how the limitations in the claims as filed distinguish the cited prior art of record.

Applicant points out that each independent claim contains **a limitation which does not appear in the prior art** which provides a superior ability to clean lines quickly during disconnect operations in the dispensing of ultra high purity chemicals for the electronics industry, particularly when the chemicals are viscous or have a fairly low vapor pressure at ambient conditions, which limitation is **diaphragm valve seat orientation**.

Those claim limitations are exemplified for each independent claim by Claim 1, as follows:

“c) a first manifold for resupplying said low vapor pressure process chemical from said bulk container to said process container through one or more **diaphragm valves having the valve seat side of the valve directed to the portion of the manifold which can be disconnected from the bulk container;**”

“e) a second manifold for delivering said low vapor pressure process chemical from said process container to said process tool through one or more **diaphragm valves having the valve seat side of the valve directed to the portion of the manifold which can be disconnected from the first manifold;**”

The bolded claim limitation addresses not just the presence of a “diaphragm valve” but its important **orientation** when processing viscous or low vapor pressure chemicals and the

lines serving those chemicals need to be opened to atmosphere (oxygen) and exposed to operators (toxicity, pyrophoricity).

The claim limitation requires that the "valve seat" side of the "diaphragm valve" be directed to the side of the valve which will be "disconnected". The valve seat side of the diaphragm valve has been determined by the inventors from experimental results to be more readily cleaned of residual chemical by the operations of purging, vacuuming and solvent extraction, allowing considerably less time for container changeout and thus more up time for the extremely expensive fabrication tools or reactors used by the electronics industry.

The orientation of the "diaphragm valves" of the present invention as claimed are best viewed in FIG 3, where the diaphragms are illustrated as #178 and #192 and the "valve seat" is #180 and #190.

Applying the "diaphragm valve" "valve seat" side to the schematic of FIG 2, the diaphragm valves #28 and #26 have their "valve seats" on the downstream side of valves #28 and #26 and not on the bulk container #12 side of diaphragm valves #28 and #26.

This is consistent with the limitations in Claim 1(c) and (e), quoted above, and is similar to the other independent claims.

Likewise, with regard to process container #14, its diaphragm valves #40 and #88 have their valve seat sides on the downstream side of the process container #14 and not on the process container #14 side of the diaphragm valves #40 and #88.

This **orientation** of the diaphragm valves allows the preferred cleaning that reduces cleaning time before the lines downstream of the container valves #28, #26, #40 or #88 are opened for container changeout or system servicing. As indicated at page 28, paragraph 0086, the reduction in time to clean and changeout a container can be dramatically reduced from days/hours to hours/minutes depending on the chemical that is being processed.

The examiner **admits** that the three Gregg, et. al. patents; '599, '026 and '494 do not even suggest diaphragm valves, much less the **orientation** of diaphragm valves.

The examiner cites DuRoss, et. al. '786 for its recitation to diaphragm valves. The '786 patent is not directed to solvent cleanout like the Gregg, et. al. patents are, so the suggestion to use '786's diaphragm valves in Gregg, et. al. is not apparent.

However, importantly, DuRoss, et. al. '786 **orients** its diaphragm valves **oppositely** than the independent claims of the present invention, as quoted above. The DuRoss, et. al. '786 container #12 is disconnected at the pigtail #164, while the diaphragm valves #202 and #204 have their "valve seat" side of their diaphragm **oriented away** from the pigtail #164 where disconnection occurs, per DuRoss, et. al.'s Specification at column 10 lines 1-7.

Thus, although DuRoss, et. al. '786 had within its possession the concept of diaphragm valves, it did not appreciate the significance of **orienting** those diaphragm valves with their **valve seat side toward the point of disconnection**, because DuRoss, et. al. did not discover and did not conceive of the idea that such an **orientation**, as claimed in the present invention's claims, would provide such an unexpected and superior ability to clean lines prior to disconnection in the critical, high purity operations of electronics fabrication.

Applicant suggests that there is no greater illustration of invention than when the prior art has aspects of the invention at its fingertips, but fails to see the solution to the problem despite being exposed to those aspects.

As a result, Applicants respectfully request reconsideration and removal of the Section 103(a) rejection and allowance of the claims due to the unique and patentable limitations that exist in the claims, as filed, which distinguish over the cited prior art of record and provide unexpected and superior results over the prior art of record.

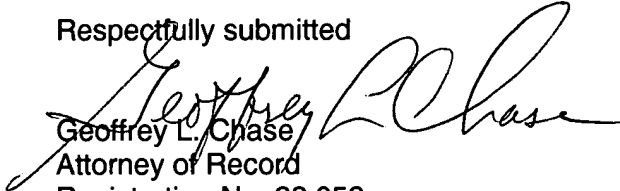
The examiner has cited additional art against Claims 7-8 and 17 regarding the use of ultrasonic sensors, but each of these claims depends from an independent claim with the limitations to **diaphragm valve seat orientation**, which makes Claims 7-8 and 17 patentable, despite Birtcher, et. al. "064.

SUMMARY

Applicant asserts that the claims as filed contain **limitations not found in the prior art** which are significant limitations which provide unexpected and superior results over the teachings of the prior art either individually or in their combination, related to **diaphragm valve seat orientation**. Applicant therefore respectfully asserts that the present claims are patentable and that the rejection should be removed and the claims allowed. Such action is respectfully requested at the examiner's earliest convenience.

Applicant has separately petitioned for an extension of time to make this Amendment timely.

Respectfully submitted


Geoffrey L. Chase
Attorney of Record
Registration No. 28,059

(610) 481-7265
(610) 481-7083 fax
chasegl@airproducts.com
7201 Hamilton Blvd.
Allentown, PA 18195-1501